

## CLAIMS

What is claimed is:

1. A phased array antenna system for a mobile platform comprising:
  - a transmit antenna disposed within at least one antenna housing;
  - a receive antenna disposed within said at least one antenna housing;
  - said receive antenna operating to receive a receive antenna signal and to convert said receive antenna signal to an aircraft communication frequency signal before outputting said receive antenna signal from said at least one antenna housing; and
  - said transmit antenna operating to transmit a transmit antenna signal and to convert said aircraft communication frequency signal into said transmit antenna signal within said at least one antenna housing.
2. The antenna system of claim 1 further comprising:
  - a converter disposed within each of the at least one antenna housing;
  - an aircraft transfer power in communication with said converter;
  - and
  - said converter converts said aircraft transfer power to a phased array antenna power.

3. The antenna system of claim 1 further comprising:

a first frequency converter disposed within said at least one antenna housing for converting said receive antenna signal to said aircraft communication frequency signal; and

a second frequency converter disposed within said at least one antenna housing for converting said aircraft communication frequency signal to said transmit antenna signal.

4. The antenna system of claim 3 further comprising;

said receive antenna signal comprising a first signal, said first signal being in a frequency range of about 12 gigahertz to about 20 GHz;

said aircraft communication frequency signal comprising a second signal having a frequency of about 1 gigahertz; and

said transmit antenna signal comprising a third signal, said third signal being in a frequency range of about 14 gigahertz to about 44 GHz.

5. The antenna system of claim 4 further comprising:

said at least one antenna housing including a receive antenna housing and a transmit antenna housing;

said first frequency converter being disposed within said receive antenna housing for converting said receive antenna signal to said aircraft communication frequency signal; and

said second frequency converter being disposed within said transmit antenna housing for converting said aircraft communication frequency signal to said transmit antenna signal.

6. A phased array antenna communication system for external mounting on a mobile platform comprising:
- a pair of antennas being one each of a transmit antenna and a receive antenna;
  - a transmit antenna housing for enclosing the transmit antenna and a transmit antenna equipment group;
  - a receive antenna housing for enclosing the receive antenna and a receive antenna equipment group;
  - each equipment group being in electrical communication with an aircraft communication signal, said signal having an operating frequency ranging from an ultra-high frequency to an L-band frequency;
  - an aircraft mounted converter to convert an aircraft service voltage to an antenna power transfer voltage; and
  - each antenna housing having a transfer converter to convert said transfer voltage to an antenna operating voltage.

7. The communication system of claim 6 further comprising:
- said transmit antenna housing having an upper surface and a first set of phased array antenna elements arranged in a grid formation on the transmit antenna upper surface; and
  - said receive antenna housing having an upper surface and a second set of phased array antenna elements arranged in the grid formation on the receive antenna upper surface.

8. The communication system of claim 7 further comprising:  
each antenna housing having an internal volume;  
each set of phased array antenna elements occupies a first  
portion of each housing internal volume; and  
a preselected one of the transmit antenna equipment group and the  
receive antenna equipment group occupies a second portion of each housing  
internal volume.

9. The communication system of claim 6 further comprising:  
each antenna being in electrical communication with an aircraft  
internally mounted receiver;  
said aircraft communication signal has a frequency of about one  
gigahertz (GHz), said frequency preselected to reduce a signal attenuation; and  
said signal attenuation allows for a distance range between each  
antenna and the aircraft receiver.

10. The communication system of claim 9 further comprising:  
said distance range between each antenna and the aircraft  
mounted receiver being between about 1.2 meters and about 62 meters.

11. The communication system of claim 6 further comprising:  
said transfer voltage comprising about a 270 volt direct current  
(DC);

said about 270 volt DC transfer voltage forming a differential pair of about  $\pm 135$  volt DC voltages;

a first of said pair of about  $\pm 135$  volt DC voltages being in communication with the transmit antenna; and

a second of said pair of about  $\pm 135$  volt DC voltages being in communication with the receive antenna.

12. The communication system of claim 6 wherein said receive antenna receives a data communication signal in a frequency range lying between about 12 gigahertz (GHz) and about 20 GHz.

13. The communication system of claim 12 wherein said transmit antenna transmits the data communication signal in a frequency range lying between about 14 GHz and about 44 GHz.

14. The communication system of claim 6 further comprising:  
said system equipment groups each include at least internal power equipment for the antenna, position control equipment for the antenna, at least one power converter for the antenna, a radio frequency monitor, and at least one of an Up-converter and a Down-converter.

15. The communication system of claim 6 further comprising:
- said transfer converter converts the transfer voltage within each housing to an antenna operating voltage of about 5 volts direct current to operate each antenna.

16. An aircraft phased array antenna communication system providing antennas and antenna servicing equipment in at least one aircraft mounted structure, said system comprising:

at least two antenna discs externally mounted on an aircraft fuselage, each disc forming one of a transmit antenna and a receive antenna;

the transmit antenna and the receive antenna each having a plurality of phased array antenna elements disposed therein;

each of the plurality of phased array antenna elements being connectably joined to a surface of a pre-selected antenna disc for one of transmitting and receiving an electromagnetic signal;

said electromagnetic signal being one of a transmit frequency and a receive frequency;

a power and control equipment group positioned within each said disc; and

each said equipment group converts between one of the transmit frequency and the receive frequency and an aircraft communication signal frequency.

17. The communication system of claim 16 wherein said equipment group comprises at least a converter to convert an aircraft voltage to an antenna operating voltage being about 5 volts direct current.



18. The communication system of claim 16 further comprising:  
said electromagnetic signal transmit frequency selected from a frequency range between about 14 gigahertz (GHz) and about 44 GHz; and  
said electromagnetic signal receive frequency selected from a frequency range between about 12 GHz and about 20 GHz.
19. The communication system of claim 18 further comprising:  
an Up-converter to convert said aircraft communication signal frequency to the transmit frequency; and  
a Down-converter to convert said receive frequency to the aircraft communication signal frequency.
20. The communication system of claim 19 wherein said aircraft communication signal frequency is selected from a frequency range between an ultra-high frequency and an L-band frequency.
21. The communication system of claim 20 wherein said aircraft communication signal frequency comprises a frequency about one GHz.
22. The communication system of claim 19 wherein said up-converter is disposed within the transmit antenna.

23. The communication system of claim 19 wherein said Down-converter is disposed within the receive antenna.

24. The communication system of claim 16 further comprising:  
the transmit antenna and the receive antenna together forming an antenna pair;

said antenna pair disposed on an upper surface location of the aircraft fuselage; and

said upper surface location circumferentially proximate to a wing leading edge intersection with the aircraft fuselage.

25. The communication system of claim 23 wherein the transmit antenna and the receive antenna form a fore-aft antenna arrangement.